

ENVIRONMENTAL FOOTPRINT FACTORS

Additional Detail

Fuel	Typical Plant Type	Emissions	Waste Products	Land Use (acres required per thousand households served) (Note - Land use includes gas production acreage for natural gas)	Water Use (gallons required per thousand households served) (Note - water use includes shale gas production water use for natural gas)	Land Use - acres per thousand MWH per year	Water Use (gallons per thousand MWH per year)	Land Use (Power Plant Footprint Only)	Water Use (at Power Plant Only)
Coal - APC	650 MW	The key air pollutant emissions during operations include oxides of nitrogen ("NOX"), sulfur dioxide ("SO2"), PM, carbon monoxide ("CO"), and VOCs.	The primary solid waste products are bottom ash from the bottom of the boiler, fly ash (FA) from the baghouse and/or gypsum from the wet scrubber (Total BA and FA: 15 to 75 tons per hour)	0.48	7,948,800	0.04	720,000	200-250 acres	7,800 gpm
Coal - New Technology (APC with CCS)	650 MW	SO ₂ emissions can be controlled to 99% to 99.9% removal depending on the type of acid gas removal technology. PM emissions are similar to a coal-fired, combined-cycle plant. CO emissions are similar to a natural gas combined-cycle plant.	Major solid wastes include spent COS hydrolysis catalyst, spent Claus sulfur plant catalyst, spent activated carbon and wastewater	0.97	7,948,800	0.09	720,000	400 acres	7,800 gpm
Natural Gas - Combined Cycle	540 MW	Typically, a gas fired combined cycle plant must control and measure NO _x , CO, ammonia, PM, and sometimes opacity.	Wastewater	0.25	4,805,160	0.02	435,250	20 to 40 acres	3,600 gpm
Advanced Nuclear	2,200 MW	Typically thought in the industry to be emissions "free", as related to the specific emissions associated with actual energy production.	Irradiated waste products	0.81	varies	0.07	varies	1 to 5 square miles	Highly variable, depending on the cooling system.
Hydro	500 MW	Typically thought in the industry to be emissions "free", as related to the specific emissions associated with actual energy production.	None	varies	N/A	varies	N/A	Varies considerably, depending on the specific hydro technology employed.	N/A
Geothermal	50 MW	Typically thought in the industry to be emissions "free", as related to the specific emissions associated with actual energy production.	None	varies	6,624,000	varies	600,000	Varies considerably, depending on the specific reservoir.	500 gpm with wet cooling
Biomass - MSW	50 MW	The key air pollutant emissions during operations include NO _x , CO, PM, SO ₂ , hydrogen chloride ("HCl"), certain heavy metals such as mercury ("Hg"), and NH ₃ slip.	Non-processible wastes, fly ash & bottom ash (monofill-typical)	0.63	9,200,000	0.06	833,333	15 - 25 acres (assuming no evaporation ponds)	Depends on technology and location,
Biomass - BFB	50 MW	The key air pollutant emissions during operations include NO _x , CO, PM, and ammonia ("NH ₃ ") slip.	Fly Ash & Bottom Ash (For beneficial use or landfill)	1.18	7,948,800	0.11	720,000	30 - 40 acres (for typical 50 MW project)	600 gpm
Solar - PV	150 MW	None	None	44.11	NA	4.00	na	7 acre / MW	none
Wind - Onshore	100 MW	None	None	18.00	0.00	1.63	na	Average is 50 acres under lease for each MW of installed capacity. Actual footprint of towers, roads and crane pads is much less but varies by project. Typically about five acres are purchased for the collection station, maintenance building and switchyard.	none

Note: water use will depend upon type of cooling system used: once through, mechanical cooling tower or air cooled. Based on a typical wet mechanical system, which uses approximately 12 gpm/Mwe